

Do cyclists have an exaggerated view of the risks of cycling and the efficacy of cycle helmets?

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Abstract

This dissertation examines whether cyclists have a realistic appreciation of the effectiveness of cycle helmets, and whether they have a realistic appreciation of the risks of cycling, and whether the two are related. Because cycle helmets and fear of cycling are deter cycling, and it is government policy to increase cycling for health and other reasons, exaggerated views may prevent policy being carried into practice.

A survey of over 300 cyclists was undertaken to discover the views of cyclists in those two areas. Interviews were also conducted with ten cyclists to explore the subject in more depth.

An extensive literature search was also done, including publicity and research about risks of cycling and helmet effectiveness. This included academic research and also the popular media, to examine if that could be a formative factor in cyclists' perceptions.

The surveys were analysed using a spreadsheet programme, whilst the interviews were examined for common themes and explicit reasons for attitudes. The results were discussed and interpreted and conclusions drawn.

The main conclusion is that the majority of the people surveyed do have an exaggerated opinion of the effectiveness of cycle helmets, and an exaggerated opinion of the risks of cycling, and that the two are associated. These perceptions are likely to be caused by exaggerations in the promotional material for helmets, which exaggerates both the risks of cycling and the effectiveness of helmets.

Following on from this, the exaggerations in the promotional material are likely to both prevent some people from cycling because of the fear of the risk, and to induce risk compensatory behaviour in those who chose to cycle and wear a helmet.

Given the overwhelming benefits of cycling, helmet promotion is found to be counterproductive in both economic and public health terms.

Introduction

I have been interested in cycle helmets for some time, having followed the controversy about their effects in the published literature, and I decided that my MSc dissertation would be about them. The research of Dr Walker (2007) which demonstrated that drivers passed closer to cyclists who wore helmets, was the inspiration behind this choice.

The predictions of the efficacy of cycle helmets are very impressive, with the figure of 85% reduction in deaths and injuries being the most frequently quoted, but at a population level there has been no detectable effect. There are several proposed explanations for this very large difference between expectation and results: increased injuries caused by the helmet,

and risk compensation. My dissertation aimed to look at the second, risk compensation, and to find out whether cyclists had a realistic perception of the efficacy of cycle helmets, whether they had a realistic perception of the risks of cycling, and whether the two were linked. If the perceptions of helmet efficacy are exaggerated, this could lead to risk compensation behaviour. Similarly if the perceptions of the risks of cycling are exaggerated, they are likely to suppress the amount of cycling, leading to a significant reduction in health.

To determine the views of cyclists, a combination of surveys and interviews was used, with over three hundred surveys being returned, and ten interviews conducted. Since much of the controversy about the efficacy of helmets is based on statistical interpretation, analysis of the surveys was deliberately simple. Interviews were examined for common themes and responses to similar questions.

A literature survey was conducted, which included both academic publications and general publications and advertising about helmets. The popular media and advertising, both overt and covert, and the messages in it, were particularly important, since they were likely to influence the attitudes of cyclists.

Efficacy of helmets

To decide whether cyclists' views are realistic or exaggerated, the efficacy of helmets needs to be established.

The research showing massive benefits from helmet-wearing is all small scale, short term and of the case control study type. There are several scales for indicating the reliability of types of research, and these recognise that case control studies are less reliable than many other types of research, and there have been several cases where they have been proved to be completely wrong e.g. Hormone Replacement Therapy. The most likely error in case control studies is a failure to account for confounding factors, and therefore wrongly attributing an effect to a particular cause. The research claiming 85% effectiveness (Thompson, Rivara and Thompson, 1989) has been heavily criticised on these grounds. The authors themselves no longer support this figure, and no other original research has found such a high figure, but it is still the most quoted figure about helmet effectiveness, in both helmet promotion and academic papers. Many other studies which claim to show significant benefits from helmets are meta-studies which include the heavily criticised Thompson, Rivara and Thompson research, without acknowledging the criticisms of it.

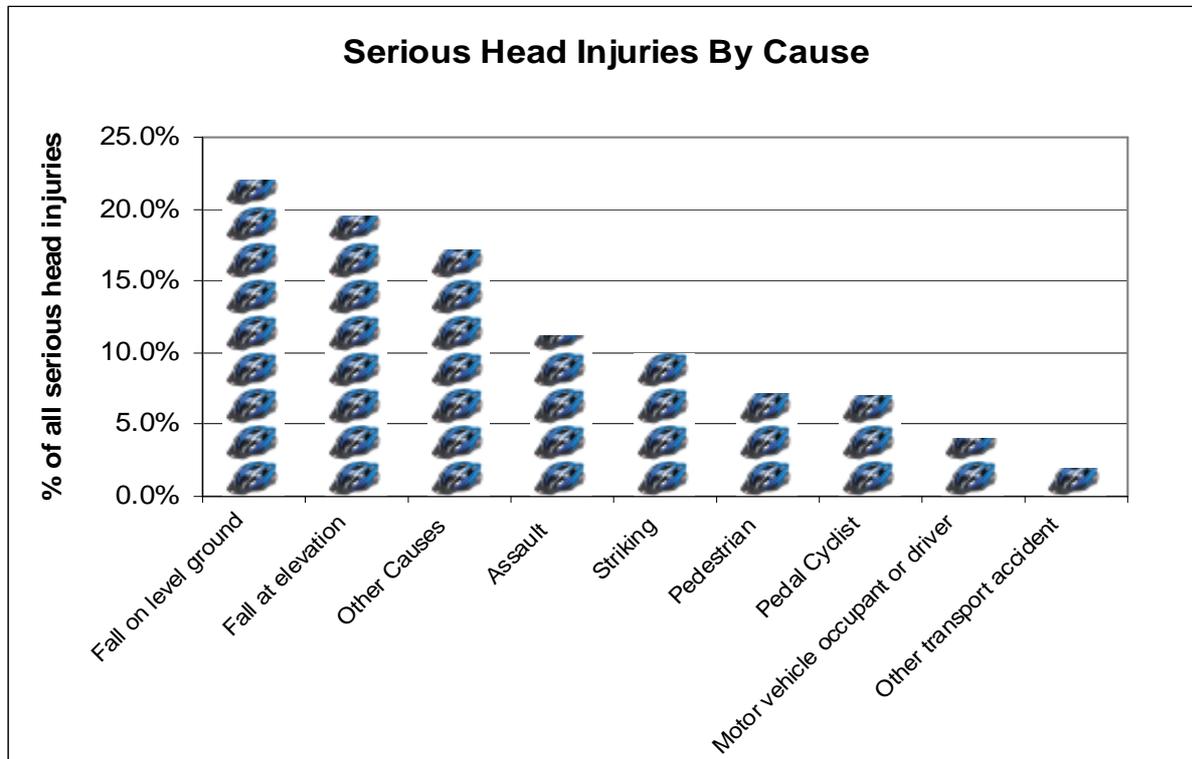
The research showing no benefits from helmet-wearing is of large scale, long term population trends, and, on the scales for reliability of research, are significantly more reliable. The largest study ever done (Rogers G B, 1988, p307) studied over 8 million cases of injury and death to cyclists over 15 years in the USA and he concluded "There is no evidence that hard shell helmets have reduced the head injury and fatality rates. The most surprising finding is that the bicycle-related fatality rate is positively and significantly correlated with increased helmet use."

Similarly, Robinson analysed the results of the Australian cycle helmet laws (2006, p722) and found that there was a "...lack of obvious effect on head injuries from helmet Laws".

The original standards for helmets, e.g. Snell B-90, specified that they should absorb the energy of a collision at approximately 12mph, but the current standard, EN1078, is lower, and therefore the design speed for protection is likely to be closer to 10mph.

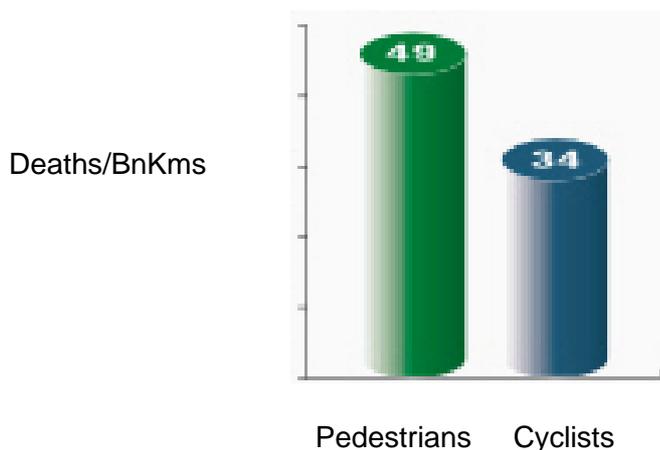
Risks of cycling

DfT figures (2007, p162) show that, for distance travelled, cycling is approximately as dangerous, or as safe as, walking.



Serious head injuries by cause (Chapman G, undated)

It can be seen from the above that collectively, pedestrians suffer considerably higher levels of head injury than do cyclists.



Relative risk of death for cycling and walking (Wardlaw M, 2002, p352)

It is therefore clear that cycling poses no greater risk than other common activities, such as walking, for which special safety equipment is never called for.

If it has been shown that, for distance travelled, cycling is safer than walking, and that cycle helmets are designed to protect at approximately 10mph, then these figures can be used as a baseline to demonstrate whether cyclists have an exaggerated view of the risks of cycling and the efficacy of helmets. It could also be said from the whole population data, that helmets have no effect on the serious injury or death rate of cyclists, but for the purpose of this paper, the design parameters of helmets was selected as being appropriate.

Methodology

A survey (Appendix A) was designed to elicit information about attitudes towards helmets and cycling, and to discover the sources of such attitudes. This was distributed to local cyclists by various means, and over 300 responded.

The survey was distributed so as to achieve a wide range of age and type of the respondents, from schoolchildren undergoing cycle training to club cyclists, from utility cyclists to leisure cyclists. They were distributed both electronically, to work colleagues, and in paper form at cycle training, other employers, at cycle rides and other meetings, and a record was kept of the source of the response. The response rate was high, possibly indicating the interest in the subject. The responses from children undergoing training and from Sustrans employees would be particularly revealing, given that the first group would have recently been given information about helmets, and the second group could be expected to be well informed on the subject.

A number of surveys had unanswered questions, most commonly being about the speed at which helmets are effective, but almost all respondents replied to the questions about the risks of cycling and the protective effect of helmets. A standard text was used as a basis for the interviews, to ensure that the relevant details were examined and that the results would be comparable. Ten work colleagues were interviewed, and varied in age, experience and type of cycling. The data were analysed for age range, type of riding, helmet-wearing, frequency of riding etc and the results charted or tabulated.

Results

The vast majority of respondents cycled on the road, and most of them wore a helmet, which, by observation, is higher than the current level. Over 60% of the respondents cycled three days a week or more.

The answers to Q6 "It is more dangerous to make the same trip by cycling rather than walking" demonstrates that many people consider cycling more dangerous than walking.

Disagree /agree	No of respondents	%
Strongly agree	62	21.2
agree	84	28.8
neutral	78	26.7
disagree	47	16.1
Strongly disagree	21	7.2
Total	292	100

Table 1 - Cycling more/less dangerous than walking

Whilst a considerable number of people thought that cycling and walking the same trip posed a similar risk, more than twice as many, 146, considered cycling to be more dangerous than those who thought it less dangerous, 68.

Q7 “Cycle helmets prevent death and serious injury”

Disagree /agree	No of respondents	%
Strongly agree	113	40.2
agree	59	21
neutral	72	25.6
disagree	19	6.8
Strongly disagree	18	6.4
Total	281	100

Table 2 - Cycle helmets prevent death and serious injury

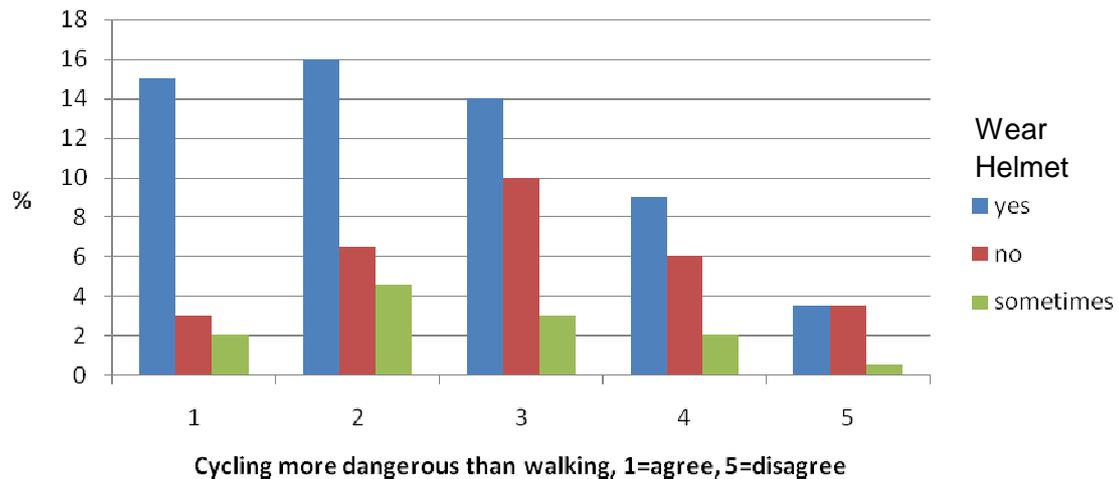
This table clearly shows that the majority of respondents (172, 61.2%) consider that cycle helmets are effective at preventing death and serious injury, whilst a small minority (37, 13.2%) are of the opposite opinion.

Question 8 “If cycle helmets do prevent death and serious injury, up to what collision speed?” had the lowest response rate, with many people saying that they had no knowledge of this, or that their answer was a guess, but many people considered them to be effective at speeds many times their design capability. Only 20.8% correctly answered this question, with the majority of the rest saying either 20 or 30mph, and eight people thought they were effective at 60mph.

The biggest source of information about helmets was from other cyclists (19%) followed by magazines (9.2%) and cycle shops (6.9%) but 20% of people said that they did not get their information from any of the suggested sources, listing “other”. Since so many obtained their information from other cyclists, it is likely that the myth of high helmet effectiveness is being repeated by those convinced that this is a fact, and this is likely to give rise to peer pressure.

The proportion of cyclists wearing helmets fell with age, from 87% at age less than ten, to 50% at age 61+, which is probably due to parental pressure on children and that many older cyclists have never worn a helmet.

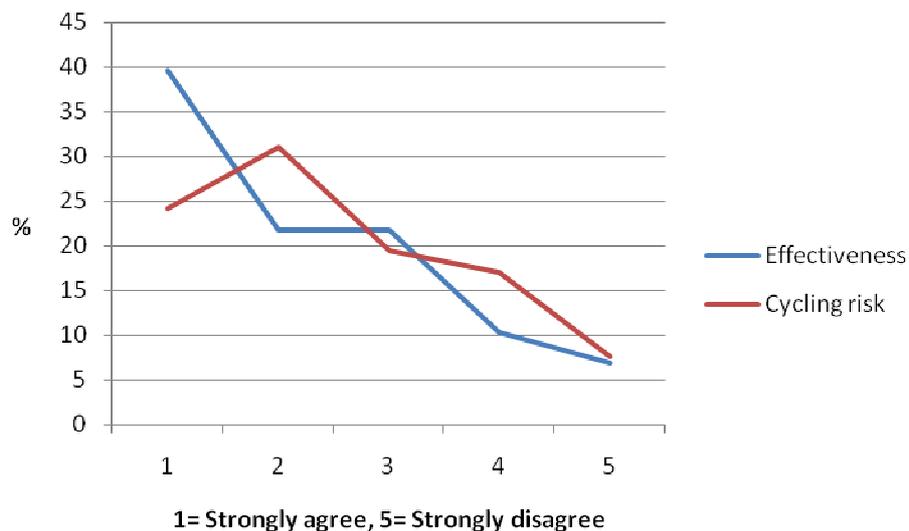
Many more people who cycled on the road wore helmets compared to those who did not ride on the road, probably due to fear of collision with a motor vehicle, ironically where a helmet is least likely to be effective.



Graph 3 – Cycling more dangerous than walking vs helmet-wearing

Graph 3 demonstrates, not surprisingly, that most people who consider cycling to be more dangerous than walking for the same trip also wear helmets. Similarly, those who considered that helmets prevented death and serious injury were much more likely to wear one, and those who considered them ineffective were unlikely to do so. Cyclists who drive were more likely to consider that helmets would prevent death or serious injury, which tends to confirm the findings of Dr Walker.

Comparing attitudes about cycle helmets and attitudes about the risks of cycling showed that the two did appear to be linked.



Graph 4 –Attitudes about helmet effectiveness and the risks of cycling

Interviews

Most of the interviewees were experienced utility cyclists, and most of them were involved with transport as part of their jobs, and could therefore be expected to have some understanding of the issues involved. Five were regular helmet wearers and five were not. There were a number of common concerns; helmet hair, peer pressure, other safety measures more effective, other road users had similar casualty rates, risk compensation, inconvenience, attitudes of other road users.

These results appeared to support Prospect theory, which suggests that people assign higher values to losses than to gains. Prospect theory also suggests that people exaggerate small risks and adjust their behaviour accordingly, and again, this appeared to be supported, with the helmet wearers acknowledging the limited effectiveness of helmets, but choosing to wear one despite the low risk of a head injury from cycling.

Discussion and interpretation

This research shows that cyclists do have an exaggerated view of both the risks of cycling and the efficacy of cycle helmets and that the two appear to be linked.

Since it appears that risk compensation affects drivers passing cyclists, it seems inevitable that it would affect cyclists who have an exaggerated expectation of the protective effect of their helmets. It therefore appears that risk compensation is a likely explanation for the failure of helmets to protect at a population level, at least in part.

In countries where cycling is seen as a perfectly normal thing to do, e.g. Denmark and Holland, very few people wear a cycle helmet, but the death and injury rate of cyclists is much lower than countries where most cyclists wear a helmet, but there are fewer cyclists. There appears to be little advertising of helmets in countries with high levels of cycling.

There is long term, covert and overt advertising of helmets in the UK, which exaggerates both the risks of cycling and the efficacy of cycle helmets, and it is inevitable that this has had an effect on public perceptions. Cycling England acknowledge this "Within our own remit, we estimate that overstated safety fears have significantly contributed to a fifty percent decrease in young people's cycling over the space of a generation...." (2007).

It would seem that helmet proponents have adopted the principles of the market place, by creating a need by describing cycling as dangerous, and then fulfilling that need by offering helmets. Helmet manufacturers can do no such thing, as they would fall foul of the advertising laws, and it seems perverse that helmet promoters can make statements that a seller cannot, and effectively sell the product for them.

But why do cyclists have such exaggerated views if the most reliable evidence shows otherwise? There is an effect, dubbed "Persistence of Myths" which is where people remember oft-repeated but incorrect information, and less often repeated but accurate information is forgotten. The myth of helmet efficacy has existed for so long, and the figure of 85% has been repeated so often, that many people consider them as proven facts.

There is also a tendency for research which shows that helmets are effective, and goes on to propose that a law be passed making it a crime to cycle without a helmet, are given widespread media attention, but refutations of that research receive almost none. The case

of the research by Cook and Sheikh (2003) who proposed that a helmet law should be passed on the basis of flawed statistics received considerable publicity at the time, but later analysis showing that their figures were incorrect received almost none. This also extends to professional journals, many of which published the original research but do not appear to have published the subsequent refutation.

The only demonstrable effect of helmet laws and promotion is an immediate and sustained fall in the number of cyclists, and the falls in deaths and serious injuries to cyclists is entirely explained by this fall. There is therefore, a large reduction in the number of people gaining the benefits of regular exercise, which outweigh the risks by a factor of at least twenty. Given the concerns over obesity and the importance of regular exercise in maintaining fitness and controlling weight, the results of helmet laws appear to be inevitably negative and very large indeed.

“Physical activity reduces the risk of developing major chronic diseases by up to 50%, and the risk of premature death by about 20-30%.” (MacDonald B, 2007).

Cycling may not be a panacea for modern ills, but if sufficient people can be persuaded to take it up regularly, there will be a large positive effect on public health. Therefore anything which might possibly deter people from so doing, should be of such clear and overwhelming benefit that it would outweigh the loss of public health from the resultant reduction in cycling. The most reliable evidence shows that helmets produce no such benefit, and therefore their promotion cannot be justified, and indeed, such promotion should be discouraged by any and all with an interest in public health. It is therefore ironic in the extreme that some of the greatest proponents of cycle helmets are from the medical profession; British Medical Association, Royal College of Nursing, Royal College of Paediatrics and Child Health, Royal College of Surgeons and the World Health Organisation all have policies promoting cycle helmets and cycle helmet laws.

How can cyclists views be changed?

It is difficult to change deeply entrenched views, especially when those views are accepted by many people, including other cyclists and authority figures such as doctors. Nevertheless, the benefits of doing so are so large to society and individuals that a sustained effort would be worthwhile and should be made.

A first step would be to stop the continuous repetition of the message that cycling is dangerous, but this is being repeated government, both local and national, and other powerful establishment organisations, and they appear to be immune to argument. Even if they could be persuaded to cease the continual repetition of inaccurate and misleading information, this would not be enough to change opinions, as it is so widely accepted as true, and many people get their information from other people, who have already been misled.

Given the evidence about the persistence of myths “....attempts to inform people that a given claim is false may increase acceptance of the misleading claim” (Schwarz et al, 2007) it will take considerable resources and time to debunk this particular myth.

What public policies are affected?

There are many government policies on health, transport, pollution and global warming which are affected by people's view of cycle helmets and the dangers of cycling, and it is perverse that one arm of government is promoting cycling for all those reasons, whilst another arm deters cycling by promoting helmets.

Such policies are not limited to government however, and many other organisations concerned with the public health have policies which are affected, including the British Medical Association, Royal College of Nursing, World Health Organisation, Royal Society for the Prevention of Accidents, British Heart Foundation and many others. All of these organisations exist to promote public health, but their policies on cycle helmets have an adverse effect on it. Many of them have based their policies on helmets on highly selective evidence, and they tend to ignore evidence which shows helmets to be ineffective or that they deter cycling, but, as respected organisations, their support of helmets is effective.

Possible courses of action

Cycle helmet promotion and laws are counterproductive for the public health and the public purse, and it is therefore necessary to cease helmet promotion immediately, in order that resources dedicated to that purpose may be used usefully. If the continual message that cycling is dangerous and helmets are a panacea to that danger is stopped and corrected, it is likely that many more people would cycle and gain the benefits, as well as society.

There is a clear need for the public to be informed about the risks of cycling, the efficacy of helmets and the dangers of risk compensation, and the government and other bodies have a responsibility to provide accurate and honest information.

Summary

Many cyclists have an exaggerated view of the risks of cycling and the protective effect of cycle helmets, and the two do seem to be linked. The most likely cause of these views is the long term, insidious advertising of cycle helmets, which exaggerates both and links them together.

Cycle helmet laws and promotion have depressed levels of cycling without affecting the death or serious injury rate of cyclists, leading to significant public health costs, personal costs, increased traffic congestion, pollution and danger.

The benefits of changing the views of cyclists and others are so overwhelming that urgent action is necessary, starting with the immediate removal of inaccurate, misleading information, and followed by campaigns showing the actual risks of cycling and the lack of effects of helmets.

This is a very brief digest of my dissertation. If you would like to read it in full, please email me: burtthebike@blueyonder.co.uk

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Cycle helmet Survey

This is a short survey about what you think about cycle helmets. No information which can identify you is asked for. Please answer as accurately as possible.

Answer the questions by circling your answer e.g. **YES** **NO**

1. How old are you? **11-16** **17-21** **22-30** **31-40** **41-50** **51-60** **61+**

2. Do you ride a bicycle on the road? **YES** **NO**

3. If you ride a bicycle on the road, do you wear a helmet? **YES** **NO** **SOMETIMES**

4. If you ride a bicycle, approximately how many days a week do you do so?

1 **2** **3** **4** **5** **6** **7**

5. Do you drive a car? **YES** **NO**

6. It is more dangerous to make the same trip by cycling rather than walking.

(1=Strongly agree, 5=Strongly disagree)

1 **2** **3** **4** **5**

7. Cycle helmets prevent death and serious injury.

(1=Strongly agree, 5=Strongly disagree)

1 **2** **3** **4** **5**

8. If cycle helmets do prevent death and serious injury, up to what collision speed?

10mph - **20mph** - **30mph** - **40mph** - **50mph** - **60mph**

9. Where did you get your information about cycle helmets and their effect on safety?

Bicycle Helmet Initiative Trust - **Teacher** - **Family** - **Friends** - **Highway Code** - **Trainer** - **Department for Transport** - **Magazine** - **Newspaper** - **Other cyclists** - **Cycle shop**

Other, please say where.....

Any other comments?

Thank you for your time.

Appendix B

Interview text

Brief introduction:

This is a brief interview, and there are no trick questions.

I'm doing some research into what people think about cycle helmets for my dissertation, so this is all about what you think, and there are no right or wrong answers.

You will not be identified in the dissertation.

Questions:

Are you a cyclist?

Do you do a lot of cycling?

Are you ever put off by bad weather?

Do you wear a cycle helmet?

If yes, then why?

Is there any particular incident which happened to them or to an acquaintance that has influenced them?

Was there any peer pressure to get you to wear a helmet?

Are you more likely to wear a helmet if lots of other people do?

Have they fallen off themselves?

How effective do you think a helmet is?

 In just falling off?

 And in collision with a motor vehicle?

Are you aware of any research into the effectiveness of cycle helmets?

Have you seen any publicity about cycle helmets?